POWER CONVERTER UNIT (PCU), 628035

GENERAL DESCRIPTION

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1. GENERAL

1.01 This Section provides a general description of the ITT D448 power converter unit (PCU), 628035 (Fig. 1), to the functional block diagram level.

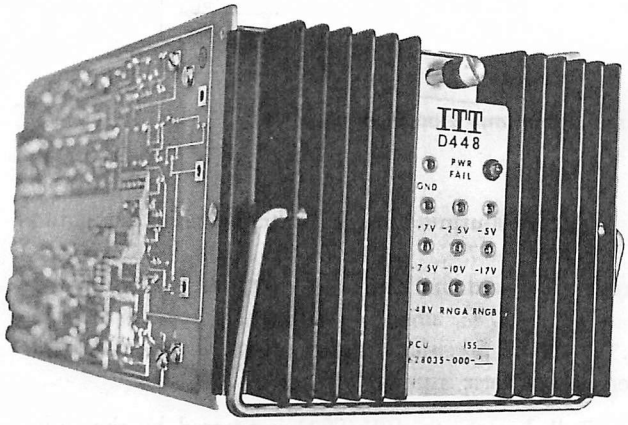

Fig. 1—PCU, 628035

1.02 This Section has been reissued to correct the designation of the −48V test point.

1.03 The unit develops all the voltages required by the D448 multiplex terminal.

2. DESCRIPTION

2.01 The unit mounts in the D448 multiplex shelf (common equipment mounting section) in connectors J1C and J2C. Installation procedures for the unit are provided in Section ITTR-18-431 (for Mode 1 operation), ITTR-18-432 (for Mode 2 operation), or ITTR-18-433 (for Mode 3 operation).

2.02 The unit is available in Group -0 only.

2.03 The unit consists of two epoxy-glass printed circuit boards (PCBs) and associated circuit components. Chassis plates, which add strength and stability to the unit, are mounted between the PCBs on the top and bottom of the unit. Four holes punched in each chassis plate assist in heat dissipation. The front panel of the unit is fitted with extraction handle which facilitates removal of the unit from the shelf. Also located on the front panel is a screw-slot mechanism to positively retain the unit in the shelf. Identification on the front panel indicates the unit mnemonic (PCU), part number, and issue letter.

2.04 The PWR FAIL LED (DS1) and the GND, +7V, −2.5V, −5V, −7.5V, −10V, −17V, RNGA, RNGB, and −48V test points (TP1 through TP10, respectively) are located on the front panel of the unit.

2.05 Printed circuit wiring is etched on both sides of each PCB. The unit inputs and outputs are terminated in gold-plated contacts on the rear edge of each PCB. These contacts mate with 70-pin contact edge connectors on the rear of the multiplex shelf.

3. FUNCTIONAL OPERATION (FIG. 2 AND 3)

VOLTAGE GENERATION

3.01 Office battery (−48 Vdc) is applied to the delay circuit on the alarm board and to the regulator board through a surge-limiting resistor. After a 1-second delay, the resistor is shorted to connect the office battery to the regulator board as −48VS.

3.02 Soft-start operation (gradual increase in output upon application of power) is provided by the oscillator and error amplifier. The oscillator and error amplifier generates a square wave which is applied to the

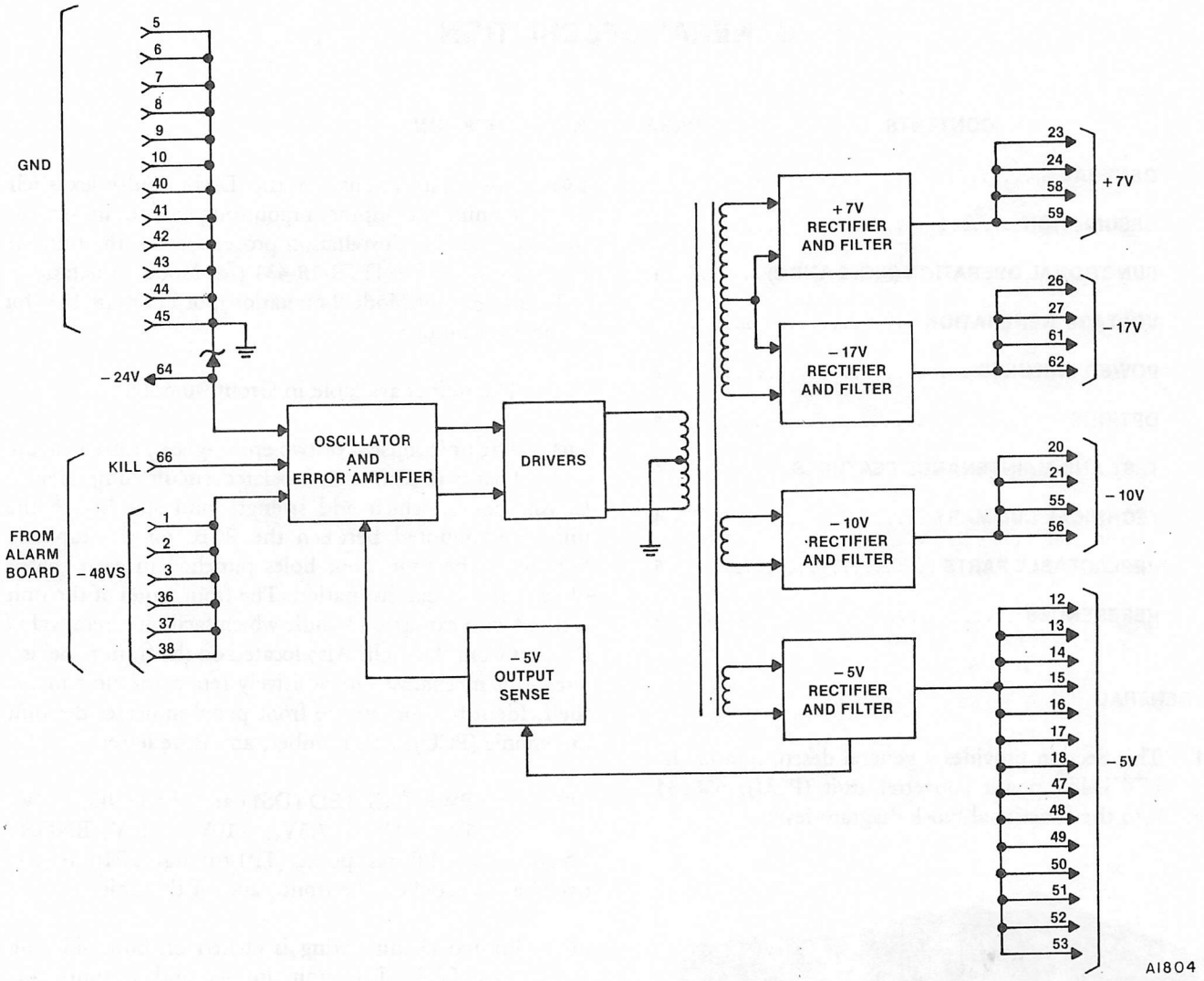

Fig. 2—PCU, 628035 (Switching Regulator Board), Functional Block Diagram

drivers. The drivers alternately drive the power transformer. The secondaries of the power transformer are wound to provide a 12V output, 10V output, and 5V output.

3.03 The 12V secondary is applied to both the +7V rectifier and filter and the −17V rectifier and filter. The 5V and 10V secondaries are applied to their respective rectifier and filter.

3.04 The output of the −5V rectifier and filter is monitored by the −5V output sense circuit. If this circuit detects an increase or decrease in the −5V output, it signals the osicllator and error amplifier to alter the pulse widths of the square wave to bring the output back to its proper level.

3.05 The four output voltages of the switching regulator board (+7V, −5V, −10V, and −17V) are distributed around the multiplex terminal. Additionally, the +7V, −17V, and −5V outputs are fed to the −7.5V/−2.5V precision supply on the alarm board for generation of these supply voltages.

3.06 Talk battery (−48V TB1) is filtered by the unit before being applied to the channel units as −48V TB. Ringing voltage is fed through the unit to provide access to these voltages at test points on the front panel of the unit.

POWER FAILURES

3.07 The alarm board senses undervoltage and overvoltage conditions associated with the unit. If an

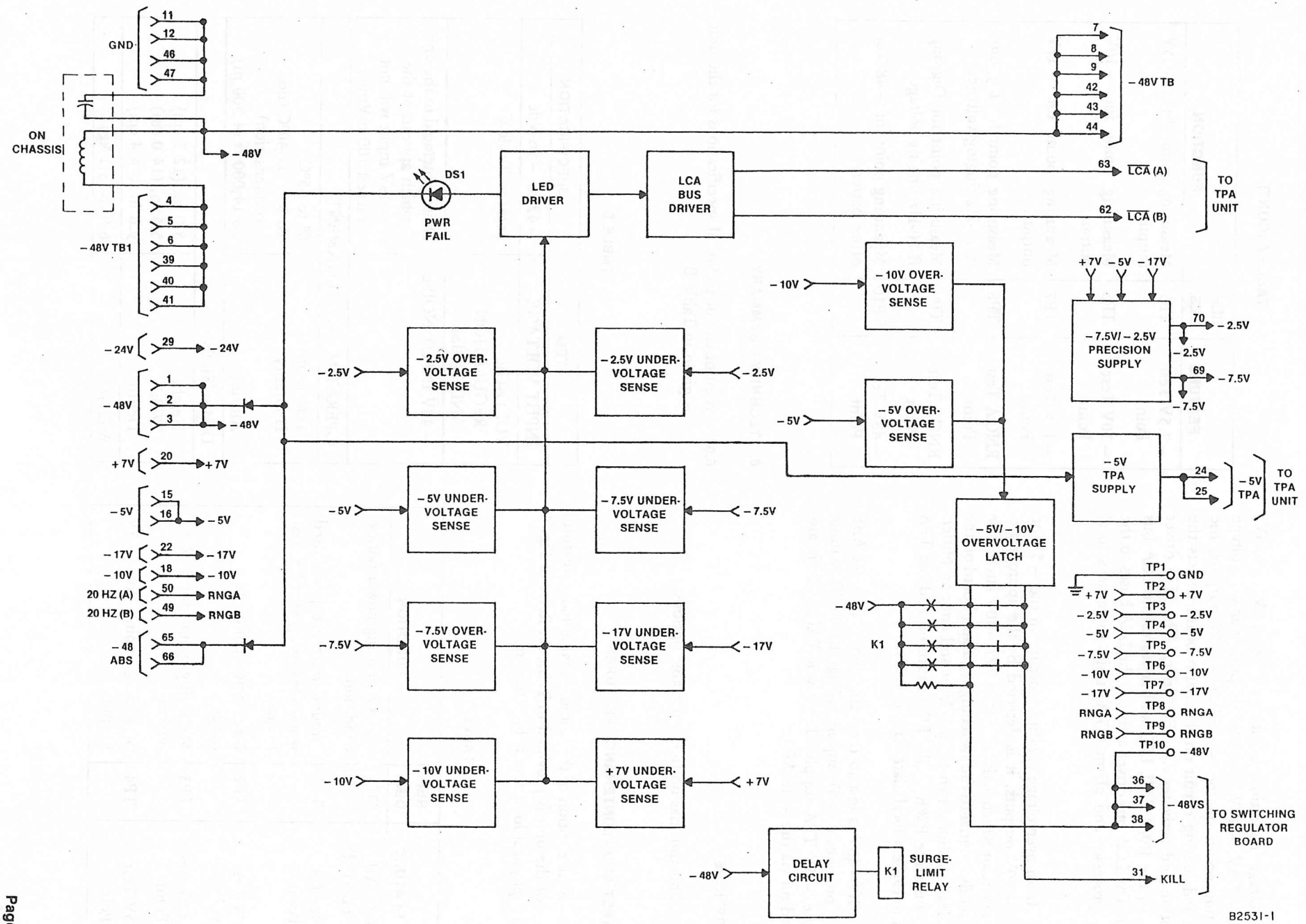

Fig. 3—PCU, 628035 (Alarm Board), Functional Block Diagram

undervoltage condition occurs on the +7V, −2.5V, −5V, −7.5V, −17V, or −10V outputs or an overvoltage condition occurs on the −2.5V or −7.5V outputs, the associated sensing circuit on the alarm board detects the condition and activates the LED driver. The LED driver turns on the PWR FAIL LED and activates the LCA bus driver. The LCA bus driver activates the LCA buses to the trunk processor and alarm (TPA) units to cause a local alarm.

3.08 If an overvoltage condition occurs on the −5V or −10V outputs, it is detected by the appropriate sensing circuit which activates the −5V/−10V latch. The latch sends a signal to the switching regulator board on the KILL lead to shut down the oscillator and error amplifier. This causes the PWR FAIL LED to turn on and the TPA units to cause a local alarm (Para. 3.07).

3.09 If −48V is lost to the entire terminal, −48 ABS provides a −5V supply voltage to the TPA units via the −5V TPA supply. The PWR FAIL LED is also turned on via the −48 ABS.

4. OPTIONS

4.01 This unit has no field-selectable options.

5. TEST AND MAINTENANCE FEATURES

5.01 A description of the test and maintenance features of the unit is provided in Table A. Refer to Fig. 1 for the physical location of these features.

TABLE A

FEATURE	REF. DES.	FUNCTION
PWR FAIL LED (red)	DS1	Turns on during power failure conditions.
GND Test Point	TP1	Ground reference point used when measuring at other test points.
+7V Test Point	TP2	Measuring point for +7V output.
−2.5V Test Point	TP3	Measuring point for −2.5V output.
−5V Test Point	TP4	Measuring point for −5V output.

TABLE A (CONT)

FEATURE	REF. DES.	FUNCTION
−7.5V Test Point	TP5	Measuring point for −7.5V output.
−10V Test Point	TP6	Measuring point for −10V output.
−17V Test Point	TP7	Measuring point for −17V output.
RNGA Test Point	TP8	Measuring point for Digroup A 20-Hz ringing voltage.
RNGB Test Point	TP9	Measuring point for Digroup B 20-Hz ringing voltage.
−48V Test Point	TP10	Measuring point for −48 Vdc office battery.

6. TECHNICAL SUMMARY

6.01 A summary of technical specifications for the unit is given in Table B.

TABLE B

ITEM	SPECIFICATION
INPUT VOLTAGE	−42 to −56 Vdc
VOLTAGE REGULATION AND NOISE	Refer to Table C
−48V INPUT NOISE	Noise generated in the unit which appears at the −48V input will not exceed 100 mVrms.
OPERATING ENVIRONMENT	
Temperature	0° to 55°C
Humidity	To 95% at 40°C (no condensation)
Altitude	To 14,000 ft (4,300 m)
DIMENSIONS	
Height	5.0 in. (12.7 cm)
Width	5.5 in. (14.0 cm)
Depth	9.6 in. (24.4 cm)
WEIGHT	6.9 lb (3.1 kg)

TABLE C

OUTPUT (V)	MAX. LOAD (A)	TOLERANCE (V)	GENERATED NOISE (wideband rms mV)	GENERATED NOISE (dBrnc)
+7	1.7	±1.00	50	30
−2.5	0.001	±0.25	1	0
−5	9.6	±0.25	30	20
−5 TPA	0.4	±0.25	30	—
−7.5	0.001	±0.25	1	0
−10	2.4	±0.50	30	20
−17	0.92	±1.00	50	30

7. REPLACEABLE PARTS

7.01 This unit has no field-replaceable parts.

8. REFERENCES

8.01 The engineering drawings noted in Table D were used in the preparation of this Section.

TABLE D

TYPE	DRAWING NO.
Assembly	628035-000
Schematic	621052-536
Schematic	621053-536

8.02 Related information on the PCU may be found in the ITTR Sections referenced in Table E.

TABLE E

TITLE	SECTION NO.
Mode 1 Common Equipment — Installation and Pretest	ITTR-18-431
Mode 2 Common Equipment — Installation and Pretest	ITTR-18-432
Mode 3 Common Equipment — Installation and Pretest	ITTR-18-433